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INJURY OF THE LIVER;
SIXTY-FOUR OUNCES OF
BILE IN THE ABDOMINAL
CAVITY; RECOVERY.

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By DE FOREST WILLARD, M. D.,

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C., a boy five years old, was injured by a heavy express wagon, the wheels passing across his pelvis and abdomen, but whether he was upon his back or abdomen during the time of injury is unknown. The skin was not broken except in the left groin, but ecchymoses showed injury at the left hip and pelvis. No fractures of the pelvis or other bones were discovered. There was marked shock, but no collapse such as would have been expected from internal hæmorrhage if the liver substance had been torn. He passed no blood subsequently in the urine or from the rectum. During the following two weeks his temperature was reported to have run as high as 103° F. His stools, I afterward learned, were clay-colored, and he was obstinately and continuously constipated, but not jaundiced. There was marked tympanites, with tenderness in the right lower abdominal quadrant, but no tumor could be felt. He remained in bed for two months, at the

Traumatic Rupture of the Gall-Bladder.

end of which time his spine was found very tender and rigid.

He was brought to me three months after the injury. I first saw him after a journey of two thousand miles; there was extreme exhaustion, intense pain in the abdomen and back, marked bulging and extreme tenderness in the entire abdominal zone, front and back, and absolute rigidity in the lumbar and lower dorsal regions, with decided kyphosis, the spinous processes projecting, not angularly, but in a long curve; the respiration was grunting.

The abdomen was tensely distended by an elastic fluctuating mass, which occupied the entire lower segment as high as the umbilicus and the entire right side as high as the epigastrium; the left hypochondriac region was the only area which was resonant, the other three quarters of the abdominal cavity giving a perfectly flat note on percussion.

He was put at absolute rest with head extension to relieve the traumatic spondylitis.

Although his blood count did not show marked leucocytosis, and in spite of the fact that the fluctuations in temperature were not great, the fluid in the abdomen was considered to be pus; its origin either from the spondylitis or from a traumatic purulent appendicitis.

An exploratory incision was made in the right iliac region. On opening the peritonæum a thin greenish-yellow fluid, almost pure bile, gushed forth and continued to flow until sixty-four ounces (two quarts) were drained off, with entire subsidence of the abdominal tumor. There was no pus or blood. As the boy was in an extremely low condition, the prolongation of the incision upward, or a second incision over the gall-bladder with the sewing of the rent in its wall, would undoubtedly have resulted in his death; the wound was therefore closed to await a favorable time for a second operation. The patient began immediately to improve; pain ceased;

Traumatic Rupture of the Gall-Bladder.

appetite returned, and sleep, which had been greatly interfered with, became normal. The fluid slowly reaccumulated, however, and during my absence from the city he was aspirated two weeks later, thirty-two ounces of bile being withdrawn. Following this, the reaccumulation of fluid was so slow, and the improvement in general condition so marked, that I decided to await developments rather than to operate, especially as the stools showed biliary secretions that were nearly normal and digestion and assimilation were excellent. Head extension and dorsal rest were enforced, to control the traumatic spondylitis. Four weeks later a protrusion appeared at the line of the wound; this was opened aseptically and about two ounces of bile flowed from the opening. A long rubber tube was then carried upward to the site of the gall-bladder, and withdrawn slowly at each dressing. The flow of bile diminished daily and ceased entirely two months and a half after the first operation. The sinus slowly closed with stimulation by curetting, mopping with tincture of iodine, etc., until the final closure was secured six months after the first incision. A spinal support was adjusted three months after the first operation, and the child ran and played throughout the remainder of the convalescence without pain or discomfort. The stools were perfectly normal, and nutrition was perfect. At the present writing he is apparently in perfect health.

Rupture of the gall-bladder alone is exceedingly rare. It is difficult to explain how it could occur from a wheel injury such as was sustained by this boy without a rupture of the substance of the liver or some other organ. It is hardly probable that he had any gall-stones in the bladder, as he had had no previous difficulty, and there was no probability of its having been tensely distended. Since he recov-

Traumatic Rupture of the Gall-Bladder.

ered, of course it is impossible to determine whether the tear was in the duct or in the gall-bladder; the former would seem more probable on account of the slow accumulation of bile, but the wide distribution of this fluid over three fourths of the abdomen would, on the contrary, indicate that the escape had been sudden. The only clinical symptom that would point to this accident, aside from the general ones of vomiting, shock, etc., would be the presence of bile in the urine and the absence of bile in the stools, a condition that could not be determined for several days after an accident. The treatment for a wound of the gall-passages alone, would, of course, be absolute rest. If a diagnosis could be made at once (which is very improbable), laparotomy, suture, and drainage would be the surest method. Such was the course expected to be undertaken in the case of the patient, but his rapid improvement after the withdrawal of the bile deterred me from the operation, and the ultimate result, though tardy, was eminently satisfactory.

Agnew states that few recoveries follow wound of the gall-bladder. Two such accidents are among the cases of liver wounds reported by Otis.¹ Ashurst states that, if the gall-bladder itself gives way, death usually follows immediately. Stromeyer records only a single instance in which the patient got well after such a wound.

Rupture of the gall-bladder or of the biliary ducts is apt to be followed by speedy death from peritoni-

¹*Medical and Surgical History of the War of the Rebellion, Part 2, Surgical Volume, p. 148.*

Traumatic Rupture of the Gall-Bladder.

tis.² Experiments on animals show that the fatal termination is brought about, not so much by the sudden escape of bile, as by the continual pouring out of fresh quantities.

Sir Benjamin Brodie's experiments by ligation of the ductus choledochus show that the inflammatory adhesions thrown about such a ligature not only shut off the peritoneal cavity, but within two or three weeks result in a new route for the bile being established into the bowel.

Winni³ has shown by experiments that normal bile has no septic action, but that small amounts are readily absorbed. Large effusion would be liable to give rise to fatal sero-fibrinous peritonitis, unless removed surgically. The indications for operation would be the extent of bile pigment in the urine, absorption of the bile occurring immediately after its effusion into the peritoneal cavity.

A few cases are on record which prove that, if the continued escape is prevented, recovery may take place.

Barlow⁴ reports a case of a man who lifted a heavy ladder. Collapse ensued; he passed no bile by the bowel. Diagnosis: rupture of the bile ducts. He was treated by tapping at intervals of ten days, withdrawal of four or six quarts of fluid at each operation. Three months after the operation bile was reported normal in the stools. Well at end of six months.

²Ashhurst, *International Encyclopædia of Surgery*, Vol. v, p. 883.

³Sixth Congress, Italian Surg. Soc., *Riforma medica*, Naples, 1893; *Annual of the Universal Medical Sciences*, Vol. iii, 1893, C. 28.

⁴*Medico-chirurgical Transactions*, 27, p. 378.

Traumatic Rupture of the Gall-Bladder.

In Fryer's⁵ case there was a violent blow over the liver. Great shock. Three days later, white stools and jaundice. At the end of three weeks the patient was tapped; thirteen pints bile; twelve days later, fifteen pints; nine days later, thirteen pints; ten days later, six pints; bile in the stools at the end of six weeks. Recovery.

Roux⁶ reports a rupture of the liver and bile passages from which seven quarts of fluid containing biliary pigments were withdrawn, followed by recovery. The urine contained bile, and the stools were ash-gray. As bile is normally an aseptic fluid, it need not necessarily produce peritonitis.

Thomas⁷ reports a rupture of the gall-bladder from a blow on the abdomen. Laparotomy was performed three weeks later, and three quarts of bile and fluid removed. Recovery, though slow, was complete.

In a wheel injury,⁸ the gall-bladder was ruptured. Seventeen days later a laparotomy was performed and ten ounces of bile were removed from the peritoneal cavity. The gall-bladder could not be reached owing to distention, but drainage resulted in recovery, with closure of the fistula in three months.

The following fatal cases are recorded:

Skeete⁹ reports a case of a boy who had a fall.

⁵*Ibid*, *Medico-chirurgical Transactions*, Vol. iv, p. 330.

⁶*Bulletin médical*, December 8, 1895; *Marseille médical*, August 25, 1895.

⁷*Deutsche medicinische Wochenschrift*, July 14, 1892.

⁸*New York Medical Journal*, April 29, 1894.

⁹*London Medical Journal*, Vol. vi, p. 274, 1785.

Traumatic Rupture of the Gall-Bladder.

Sixteen pints of bile were withdrawn on the twenty-fourth day. The patient died six weeks after the accident. At the autopsy two gallons of bile were found in a walled-off cavity.

Fergus¹⁰ records the case of a boy who had a wheel injury. Amount of shock, trifling. Great pain in the abdomen. The patient died on the ninth day after the accident. Autopsy: The liver was found to have been lacerated to a depth of two inches and a half; the gall-bladder was ruptured above and near the junction of the hepatic with the cystic duct. There was a large quantity of bile in the abdominal cavity.

Battle¹¹ reports a case of a boy, six years old, run over by a wagon. Slight shock; few abdominal symptoms; but the patient died on the ninth day. The common bile duct was torn completely through, but the liver and gall-bladder were intact.

Leseure¹² mentions five cases, in four of which death occurred quickly. The fifth patient, a child, lived, until the fourth day.

In Sutton's case, abdominal pain steadily increased from the time of injury. Jaundice and great abdominal distention supervened, and death occurred on the thirty-eighth day.

¹⁰*Medico-chirurgical Transactions*, Vol. xxxi, p. 47.

¹¹*British Medical Journal*, April 7, 1894.

¹²*Sur les ruptures et les perforations de la vésicule biliaire*, Paris, 1824.

